

**Claims:**

1. A method for broadcasting beacon frames in a short-range wireless ad-hoc network including a plurality of wireless terminals, the method comprising the steps of:
  - establishing a beacon interval for an ad-hoc network, the beacon interval being established in a first wireless terminal;
  - broadcasting beacon frames from the first wireless terminal at the beacon intervals, whereby the first wireless terminal starts to act as a beacon broadcaster in the ad-hoc network and one wireless terminal at a time acts as the beacon broadcaster during normal operation of the ad-hoc network; and
  - introducing an identifier list into at least some of the beacon frames, the identifier list including identifiers of wireless terminals belonging to the ad-hoc network.
- 15 2. A method according to claim 1, further comprising a step of utilizing the identifier list if another wireless terminal than said first wireless terminal is to be selected as the beacon broadcaster.
- 20 3. A method according to claim 2, further comprising a step of selecting another wireless terminal than said first wireless terminal as the beacon broadcaster, wherein the selecting step is performed at predetermined intervals longer than one beacon interval and the selecting step includes choosing said another wireless terminal according to a predetermined rule from the identifier list.
- 25 4. A method according to claim 3, further comprising a step of indicating the predetermined intervals in the beacon frame.
- 30 5. A method according to claim 2, further comprising a step of choosing another wireless terminal than said first wireless terminal as the beacon broadcaster, when a predetermined number of beacon intervals is elapsed without a beacon frame being broadcast,  
wherein said choosing step includes choosing said another wireless terminal according to a predetermined rule from the identifier list.
6. A method according to claim 1, further comprising a step of transmitting, when a wireless terminal joins the ad-hoc network, an identifier of the wireless terminal to the wireless terminal currently acting as the beacon

broadcaster.

7. A method according to claim 1, further comprising a step of sending at least one traffic announcement message to the wireless terminal currently acting as the beacon broadcaster, each traffic announcement message identifying at least one wireless terminal for which another wireless terminal has data to be delivered.

8. A method according to claim 7, wherein the wireless terminal acting as the beacon broadcaster is the first wireless terminal.

9. A method according to claim 1, further comprising a step of organizing the identifiers of the wireless terminals in a priority order, which determines the order in which the terminals act as the beacon broadcaster.

10. A method according to claim 7, further comprising a step of:

- based on at least one traffic announcement message, compiling a traffic indication data element; and

- 15 - inserting the traffic indication data element into a selected subsequent beacon frame.

11. A method according to claim 10, further comprising a step of indicating a moment of the selected subsequent beacon frame in the beacon frame.

- 20 12. A method according to claim 10, wherein the traffic indication data element includes a bit string, where each bit corresponds to a terminal in the identifier list.

13. A method according to claim 1, wherein the identifier list contains MAC addresses of the wireless terminals belonging to the ad-hoc network.

- 25 14. A method according to claim 1, further comprising a step of inserting power state information in the identifier list, the power state information indicating whether a wireless terminal mentioned in the list is in a power save state.

- 30 15. A wireless terminal for a wireless short-range ad-hoc network, the wireless terminal comprising

- receiver means for receiving beacon frames at beacon intervals, at least some of the beacon frames including an identifier list including identifiers of terminals belonging to an ad-hoc network;

- 35 - control means for deciding, based on the identifier list, whether the wireless terminal is to be selected as a beacon broadcaster in the ad-hoc

network; and

- beacon broadcaster means, responsive to the control means, for broadcasting beacon frames in the ad-hoc network, the beacon broadcasting means being configured to insert the identifier list in at least some of the beacon frames broadcast by the wireless terminal.

5       **16.** A wireless terminal according to claim 15, further comprising means for sending at least one traffic announcement message to another wireless terminal, wherein said at least one traffic announcement message identifies at least one wireless terminal for which the wireless terminal has data 10 to be delivered, and wherein said another wireless terminal is the beacon broadcaster in the ad-hoc network.

15      **17.** A wireless terminal according to claim 15, further comprising processing means for receiving and handling at least one traffic announcement message identifying at least one wireless terminal for which data is to be delivered in the ad-hoc network, the processing means being 20 configured to (a) compile, based on the at least one traffic announcement message, a traffic indication data element; and (b) to insert the traffic indication data element into a selected subsequent beacon frame.

25      **18.** A wireless terminal according to claim 15, further comprising means for transmitting an identifier of the wireless terminal to another wireless terminal acting as the beacon broadcaster in the ad-hoc network.

30      **19.** A wireless terminal according to claim 15, wherein the identifier list includes MAC addresses of the wireless terminals belonging to the ad-hoc network.

25      **20.** A wireless terminal according to claim 16, wherein the traffic announcement message includes a bit string where each bit corresponds to a terminal in the identifier list.

30      **21.** A wireless terminal according to claim 16, wherein the traffic indication data element includes a bit string where each bit corresponds to a terminal in the identifier list.

35      **22.** A wireless terminal for a wireless short-range ad-hoc network, the wireless terminal comprising beacon broadcasting means for broadcasting beacon frames at beacon intervals in the ad-hoc network, wherein the beacon broadcasting means are configured to insert an identifier list in at least some of the beacon frames, the identifier list including identifiers of wireless terminals

belonging to the ad-hoc network.

**23.** A wireless terminal according to claim 22, further comprising means for establishing a beacon interval for the ad-hoc network.

**24.** A wireless terminal according to claim 22, further comprising 5 processing means for receiving and handling at least one traffic announcement message identifying at least one wireless terminal for which data is to be delivered in the ad-hoc network, the processing means being configured to (a) compile, based on the at least one traffic announcement message, a traffic indication data element; and (b) to insert the traffic 10 indication data element into a selected subsequent beacon frame.

**25.** A short-range wireless ad-hoc network comprising:

- a wireless terminal acting as a beacon broadcaster in the ad-hoc network, the beacon broadcaster being configured to broadcast beacon frames at beacon intervals and to introduce an identifier list into at least some 15 of the beacon frames, the identifier list including identifiers of wireless terminals belonging to the ad-hoc network; and  
- at least one other wireless terminal configured to extract the identifier list from a beacon frame,

wherein said at least one other wireless terminal is provided with 20 control means for deciding, based on the identifier list, whether one of the at least one other wireless terminal is to be selected as the beacon broadcaster in the ad-hoc network.

**26.** A short-range wireless ad-hoc network according to claim 25, wherein

25 the at least one other wireless terminal comprises means for sending traffic announcement messages to the wireless terminal acting as the beacon broadcaster, wherein one traffic announcement message identifies at least one wireless terminal for which the at least one other wireless terminal has data to be delivered; and

30 the wireless terminal acting as the beacon broadcaster comprises processing means for handling said at least one traffic announcement message, said processing means being configured to (a) compile, based on at least one traffic announcement message received, a traffic indication data element; and (b) to insert the traffic indication data element into a selected 35 subsequent beacon frame.

27. A short-range wireless ad-hoc network according to claim 25, wherein each wireless terminal of said at least one other wireless terminal further comprises means for transmitting an identifier of the wireless terminal to the wireless terminal acting as the beacon broadcaster.

5 28. A short-range wireless ad-hoc network according to claim 25, wherein the identifier list includes MAC addresses of the wireless terminals belonging to the ad-hoc network.

10 29. A short-range wireless ad-hoc network according to claim 25, wherein the traffic announcement message includes a bit string where each bit corresponds to a terminal in the identifier list.

30. A short-range wireless ad-hoc network according to claim 25, wherein the traffic indication data element includes a bit string where each bit corresponds to a terminal in the identifier list.